

SCO XENIX[®] System V

Operating System

Release Notes
Roadmap
Installation Guide
Introduction to XENIX
Operations Guide

The Santa Cruz Operation, Inc.

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XENIX System V Operating System Release Notes

- 1. Preface 1
- 2. IMPORTANT NOTES ABOUT INSTALLATION 1
 - 2.1 Choosing Swap Area 3
- 3. Compatible Software 3
- 4. Features of the 2.1.0 Release 4
 - 4.1 Autoboot 4
 - 4.2 Binary Compatibility 4
 - 4.2.1 XENIX 2.3 Binary Compatibility 4
 - 4.2.2 XENIX 3.0 Binary Compatibility 5
 - 4.2.3 XENIX System V Binary Compatibility 5
 - 4.3 Configurable Console Keyboard and Screen 5
 - 4.4 DOS support 6
 - 4.5 8087 and 80287 Support 8
 - 4.6 Link Kit 8
 - 4.7 Memory Limitations 9
 - 4.8 mkdev(C) 9
 - 4.9 Multiscreen™ and Color Support 9
 - 4.10 System V sh shell 11

- 4.11 Software Reboot 11
- 4.12 SVID Conformance Notes 13
- 4.13 Ulimit 15
- 5. Hardware Notes 15
 - 5.1 Clockrate Adjustment 15
 - 5.2 IMAGEN printers - ips(C) 15
 - 5.3 Serial I/O Chips 16
 - 5.4 Serial Lines 16
- 6. Software Notes 17
 - 6.1 Include Files and Utilities 17
 - 6.2 crypt(C) 18
 - 6.3 csh(C) - sh(C) Conflicts 18
 - 6.4 fdisk(C) 18
 - 6.5 format(C) 18
 - 6.6 lp(C) 19
 - 6.7 mvdir 20
 - 6.8 pg(C) 20
 - 6.9 runbig(C) 20
 - 6.10 uname(C) 20
 - 6.11 Using Raw Devices 21
 - 6.12 uucp(C) Notes 21

6.12.1	Modem Usage under XENIX	22
6.12.2	Autodialing	22
6.12.3	L-devices and L.sys	22
6.12.4	Communications with 3.0 XENIX Systems	23
6.13	vi and vedit	23
6.14	vsh(C)	23
7.	Documentation Notes	24
7.1	Blank Pages in the User's Reference	24
7.2	Hardware Related Manual Pages	25
7.3	Replacement Manual Pages	25
7.4	console(M)	26
7.5	C-shell	26
7.6	master(F)	27
7.7	su(C)	28
8.	Restoring Lost Files	28
9.	Packages In This Set	29
A.	Compatible Hardware	30
A.1	XENIX-86 System V	31
A.1.1	Machines	31
A.1.2	Math Chips	32
A.1.3	Memory Cards	33
A.1.4	Accelerator Boards	33
A.1.5	Serial I/O Boards	34
A.1.6	Tape Units	34
A.1.7	Video Cards and Monitors	34
A.1.8	Networking Cards	35
A.1.9	Add On Hard Disks	35

A.1.10	Compatible Hard Disk Controllers	37
A.2	XENIX-286 System V	39
A.2.1	Machines	39
A.2.2	Math Chips	40
A.2.3	Memory Cards	40
A.2.4	Serial I/O boards	41
A.2.5	Tape Units	41
A.2.6	Video Cards and Monitors	42
A.2.7	Networking Cards	42
A.2.8	Add On Hard Disks	43
A.3	Modems and Autodialing	44
B.	Upgrading to XENIX System V	44
B.1	Shut Down the System	46
B.2	Backup the System	46
B.3	Save Special Files	47
B.3.1	Choosing Which Files To Save	47
B.3.2	Save the Actual Files	49
B.3.3	Save Data Files and ar(CP) Libraries	50
B.4	Install XENIX System V	51
B.5	Relink the Kernel	52
B.6	Reinstall Applications	52
B.7	Merge Saved Files	52

Release Notes
Release 2.1.0
XENIX®-86 System V for personal computers
XENIX-286 System V for personal computers
Operating System
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1. Preface

This document contains information about features and programs of XENIX-86 and XENIX-286 System V Release 2.1.0 Operating System for personal computers. *Please read through this entire document before installing the XENIX operating system.*

We are always pleased to hear of user's experience with our product, and recommendations of how it can be made even more useful. All written suggestions are given serious consideration.

2. IMPORTANT NOTES ABOUT INSTALLATION

Please refer to the *Installation Guide* in the binder marked "XENIX Operating System *Run Time Environment*" to install the XENIX Operating System. If you have purchased all three systems, (XENIX Operating System, Development System and Text Processing System) you can use the *XENIX Installation Guide* to install them all at once. If you wish to install the Development System and/or the Text Processing System at a later time, refer to the *Release Notes* at the beginning of the appropriate guide (*XENIX Programmer's Guide "System Development Tools"* or *XENIX Text Processing Guide*). See also the manual page for `custom(C)`. `custom` allows you to install all or portions of the XENIX System. Read the *Release Notes* and *Installation Guide* in their entirety and make sure you completely understand the installation process before installing the product.

It is not advisable to abort the installation process (for example, by using the DEL or Ctrl-\ keys). If you need to stop, for example,

XENIX for personal computers

because you enter incorrect information, start the process again from the beginning rather than trying to proceed from the stopping point.

The three systems are delivered on these (48tpi) floppies:

XENIX Operating System	-volumes N1-N5 (versions 86XT; 6300+) -volumes N1-N4 (version 286AT) -volumes B1-B3 -volumes X1-X7
XENIX Development System (Optional)	-volumes D1-D10
XENIX Text Processing System	-volumes T1-T4

Note

Users upgrading their XENIX 3.0 system to XENIX System V should refer to Appendix B "Upgrading to XENIX System V," later in these *Release Notes*. Users installing XENIX for the first time can ignore the Upgrade appendix.

If you use **custom(C)** to install the single file */xenix* (the XENIX kernel) you must serialize the kernel by hand. This is done with the command :

/etc/brand serialnumber activationkey /xenix

If you do not do this, the kernel will boot with a very limited number of processes.

2.1 Choosing Swap Area

While installing XENIX System V you are prompted to allocate the amount of swap area you want. If you do not specify the number of blocks of swap area you want, you are automatically given a default amount. This default is minimal. Due to the difficulty in increasing your swap area, it is recommended that you ask for the upper limit amount shown by the **divvy(C)** program, if you are planning to use large applications (like databases or spreadsheet programs), use the software development set extensively, or make many programs "sticky" for performance reasons.

3. Compatible Software

The following software application packages are available from The Santa Cruz Operation for use with XENIX.

SCO FoxBASE™	Relational Database Management System
SCO Professional™	Electronic Spreadsheet
Informix®	Relational Database Management System
LEVEL II COBOL™	Mainframe Level Implementation of the business programming language
Lyrinx™	Word Processing System
Multiplan®	Electronic Worksheet
uniPATH™ SNA-3270	SNA Mainframe Communications Package

Call your local dealer or The Santa Cruz Operation for more information and for availability of the following software application packages:

Microsoft Networks for XENIX	PC network compatible LAN
UX-Basic®	BASIC Interpretive Compiler

Your local dealer may also have the following software which users have been able to run on XENIX System V for personal computers:

Microsoft Pascal 3.3 for XENIX-286
Microsoft FORTRAN 3.3 for XENIX-286
RM Fortran V1.1 for XENIX-286
RM Cobol V2.1a for XENIX-86 or XENIX-286

4. Features of the 2.1.0 Release

This section relates important features of the XENIX operating system.

4.1 Autoboot

When your computer is turned on, it can go through all boot stages automatically. Refer to the **autoboot(M)** manual page for information on configuring your system to **autoboot**.

4.2 Binary Compatibility

This section briefly discusses the types of binaries that are known to run on XENIX for personal computers. See the manual page **machine(M)** for a more complete listing of binary compatibility.

4.2.1 XENIX 2.3 Binary Compatibility

The system can execute Microsoft XENIX version 2.3 8086, split i/d (instruction/data), x.out format binaries (for example, Altos 586 or Intel 86/310/330 binaries). Use of Altos specific system calls is not supported.

4.2.2 XENIX 3.0 Binary Compatibility

The system can execute Microsoft XENIX version 3.0 8086, split i/d (instruction/data), x.out format binaries (for example, Altos 586 or Intel 86/310/330 binaries). Use of Altos specific system support calls is not supported.

4.2.3 XENIX System V Binary Compatibility

The binaries produced by the XENIX C compiler will run on SCO XENIX-286, XENIX-186, and XENIX-86 Systems, as well as Microsoft 286 XENIX 3.0 or System V and IBM XENIX 3.0 or System V.

Machines with SCO XENIX-286 installed can run Microsoft or IBM 286 XENIX 3.0 or System V binaries.

4.3 Configurable Console Keyboard and Screen

XENIX System V Release 2.1.0 supports console keyboard and console screen reconfiguration. You can reconfigure the keyboard for a different keytop layout, or program some keys, including function keys, to send strings of characters.

You can map characters so that, on output, they display as international or graphics characters. For example, you can map "e" to display as "è." Refer to the **console(M)**, **keyboard(M)**, **mapkey(M)**, and **setkey(M)** manual pages in the *XENIX Reference Manual* for information on configuring the console keyboard.

/usr/lib/keyboard and */usr/lib/console* contain files for British English (UK) and German keyboard layouts and screen mapping.

The XENIX kernel read buffers hold up to 256 characters. Overflow of a buffer causes it to be flushed and the 257th character is not echoed. If this 257th character is dropped during the output of an escape sequence, the output of that sequence is other than expected.

For example, if a function key is programmed to send "[154g" and the function key is held down so that the output of this string on the screen repeats, the 257th string character, "4," is dropped and the string interpreted would instead be "[15g" that one time.

Refer to section 7.1 “console (M)” for more information on the console.

4.4 DOS support

XENIX supports the coexistence of MSTM-DOS and XENIX on the same hard disk. Consult Chapter 3 of the *XENIX Installation Guide* and the manual entries for **fdisk(C)**, **divvy(C)**, and **dos(C)**. The **fdisk(C)** and **divvy(C)** utilities create and change multiple disk partitions, allowing separate XENIX and DOS partitions. **fdisk(C)** has similar functionality to the DOS utility of the same name. The utilities mentioned in **dos(C)** allow access to DOS files on the hard disk and floppy diskettes.

Should you decide to install XENIX and DOS on the same hard disk, be sure to reserve a sufficiently large partition for XENIX.

Note

The minimal XENIX System configuration you can install requires approximately 2000 1K blocks, or 2M bytes. The entire XENIX System (XENIX Operating System, XENIX Developmanet System and XENIX Text Processing System) requires approximately 12,000 1K blocks, or 12M bytes. Refer to the manual page **custom(C)** for information on installing or removing portions of the XENIX System.

It is recommended that DOS be installed on the hard disk before installing XENIX. Installing DOS after XENIX, in some circumstances, changes the fdisk table making the XENIX partition unbootable. (DOS fdisk reports disk size in cylinders, XENIX fdisk reports disk size in tracks.) If this happens, you must recreate the fdisk table. Boot XENIX from a Bootable XENIX floppy or use the Installation BOOT floppy. Run XENIX fdisk(C), delete the XENIX partition, then create the XENIX partition exactly as it was before DOS was installed. If you use the Installation BOOT floppy, delete from the installation procedure after you have run fdisk, and reboot the computer. The XENIX partition is once again bootable.

If you want to install XENIX and DOS on two hard disks refer to the chapter "Using XENIX and DOS on the Same Hard Disk" in the *XENIX Installation Guide* and the section titled "Adding a Second Hard Disk" in the chapter "Using Peripheral Devices" in the *XENIX Operations Guide*. Also, refer to the *XENIX Reference Manual* manual pages for fdisk(C), mount(C), and mkfs(C).

The following hard disk devices are new in XENIX System V:

```
/dev/hd0d
/dev/rhd0d
/dev/hd1d
/dev/rhd1d
```

These devices are similar to */dev/hd0a* in that the disk driver determines which partition is the DOS partition and uses that as *hd?d*. This means that software using the DOS partition does not need to know which partition is DOS (the disk driver determines that).

The file */etc/default/msdos* is an easily configurable file that aliases default device names used by the dos(C) commands. For example, it now contains the lines:

```
C=/dev/hd0d
D=/dev/hd1d
```

Users using the dos(C) utilities can specify "C:" or "D:" on the command line, referring to the DOS partition on the first or second hard disk. For a complete description on using */etc/default/msdos* see the manual page dos(C) in the *XENIX Reference Manual*.

XENIX for personal computers

The XENIX Development System supports the creation of DOS executable files, using `cc(CP)`. Refer to the *XENIX C User's Guide* and *C Library Guide* for information on using XENIX to create programs suitable for DOS systems.

4.5 8087 and 80287 Support

Your personal computer may include the 8087 or 80287 math coprocessor, which is supported by XENIX-86 and XENIX-286. Please note that switches on the main system board must be set properly to enable 8087 or 80287 interrupts. Check your hardware manual for the proper switch settings.

At boot time, XENIX will display "math coprocessor present" if an 8087 or 80287 is detected.

Some 8087 and 80287 exceptions have been masked. Refer to the manual page for 8087(M).

4.6 Link Kit

A Link Kit is provided with the XENIX Operating System. The Link Kit enables you to add device drivers to your system. Additional device drivers are necessary to run non-supported peripheral devices. Refer to Chapter 10 of the *XENIX Operations Guide*, "Installing Device Drivers", for information about using the Link Kit.

In addition, the *XENIX Programmer's Guide* contains two chapters that discuss "Writing Device Drivers," and "Sample Device Drivers." Also, the Link Kit files themselves include useful instructions and examples (including a driver for real-time clocks). Be sure to read the text files (especially the *README* file) in the directory `/usr/sys/conf` if you intend to use the Link Kit.

You may request up to 202 buffers when using the Link Kit with XENIX-286. XENIX-86 has no limit to the number of buffers you can request, but it is possible to create more buffers than available memory. If this happens XENIX will not boot.

In order to save disk space, do not install the Link Kit files unless you intend to use them. The kernel contains the data space necessary for installing device drivers in this 2.1.0 release. **custom(C)** should be used to install (or remove) the Link Kit files.

Available kernel data space (needed to link in large or multiple device drivers) has been increased in the 2.1.0 release. Device drivers which previously did not fit into XENIX might now.

4.7 Memory Limitations

Some utilities may not run on systems with less than 512 Kilobytes(K) of main memory. **vsh(C)** (the Microsoft visual shell) and **vi(C)** (the Berkeley full-screen editor) are examples of these. When you invoke a utility that needs more memory than available, the message "Killed" displays on your screen. If your system has 384K of main memory we recommend using XENIX with only one screen enabled. Multi-user mode will function, but performance suffers, with 384K memory.

vi(C) and **vsh(C)** are supported for machines with 512K of main memory or greater. Use of any medium model programs may severely impair system performance with less than 512K of main memory.

We recommend using the XENIX Development System only on machines with 512K of main memory or greater.

4.8 mkdev(C)

The XENIX Operating System now allows you to add additional filesystems more easily by using the **fs** option with **mkdev(C)**. See the manual page for **mkdev(C)** included with these *Release Notes*, Chapter 2 "Installation Procedure" in the *XENIX Installation Guide*, and Chapter 7 "Using Peripheral Devices" in the *XENIX Operations Guide*.

4.9 MultiscreenTM and Color Support

The console under XENIX can act as a console and up to 9 alternate

terminals, each of which can support different activities (see the manual pages for **console(M)** and **multiscreen(M)** in the *XENIX Reference Manual* and the chapter "Using Peripheral Devices" in the *XENIX Operations Guide*).

Note

The number of screens available depends on the amount of memory in your computer, and is displayed when the system boots. The actual number of screens **enabled** is user configurable. See **enable(C)** to use the available screens.

When error messages from the XENIX kernel appear, they display on the console screen. When this happens the console screen displays instead of the current screen.

If you have a color monitor you can use the XENIX **setcolor(C)** utility to select the foreground, background, and graphics screen colors from a palette of 16 colors (see the manual page for **setcolor(C)** in the *XENIX Reference Manual*).

4.10 System V sh shell

Included in this release is the "System V sh command programming language", found in `/bin/shV` and invoked as `shV`. There are no known problems with this shell, but it is not supported. Let us know if you encounter problems with `shV`. It has the same functionality as `sh(C)` found in this and previous releases, with the following additions:

- "command" function
- MAILCHECK parameter
- MAILPATH parameter
- SHACCT parameter
- SHELL parameter
- input/output redirection for some commands
- hash -r special command and flag
- pwd special command
- return special command

See the `shV(C)` manual page included with these *Release Notes*.

4.11 Software Reboot

XENIX System V allows software rebooting. You need not power off to reboot. The following message is displayed after a system shutdown:

**** Safe to Power Off ****

-or-

**** Hit Any Key to Reboot ****

Fixed disk heads are "parked" (locked) when this message is displayed.

Note

When the floppy drive door is closed, the computer attempts to boot from a floppy. The floppy drive door must be open to boot off the hard disk.

4.12 SVID Conformance Notes

XENIX-286 meets the System V Interface Definition (SVID) published in 1985 by AT&T (Select Code 307-127). XENIX System V has been subjected to a stringent set of tests for the purpose of verifying conformance to SVID. SCO XENIX System V conforms to SVID functionality with the following exceptions:

Function	SVID Specification	SCO XENIX Implementation
shmat	Allows non-zero arguments.	shmaddr argument must be zero. The SVID states that shmat() should allow a non-zero shmaddr argument. The segmented architecture of the 86 family precludes allowing attachment of shared memory at <i>specific</i> physical addresses. Because of this, SCO XENIX requires that the shmaddr argument be zero to allow the system to choose the first <i>available</i> address.
shmop shmctl shmget	Shared memory operations. Return "char *shmaddr"	Because of the architecture of the 86 family of chips, SCO XENIX chose to implement shared memory by using far pointers. The SVID "char *shmaddr" is replaced with "char far *shmaddr." This is for the same reason as listed for <i>shmat</i> above.

Function	SVID Specification	SCO XENIX Implementation
ptrace	Address specified as (int*)	Address specified as structure shown in section 4.6 of the <i>Development System Release Notes</i> . The SVID states that ptrace() calls should fail if the 'addr' argument is not the start address of a word. Because of word alignment conventions in the 86 family of chips this failure will not occur.

These exceptions are found on the **termio** manual pages
(**termio(dev)** for SVID and **termio(M)** for XENIX):

Termio Characters/values	SVID Specification	SCO XENIX V Implementation
QUIT	Ctrl-	Ctrl-\
ERASE	#	Ctrl-H
KILL	@	Ctrl-U
c_cc value	7 SWITCH	not included
38400 baud	B38400	not included
Block layer output - hardware control	LOBLK	not included
default initial baud rate	B300	B9600
ISIG causes input characters to be checked against	INTR, SWITCH and QUIT	INTR and QUIT

The c_cc value of SWITCH, the block layer output value of LOBLK, and ISIG checking against SWITCH are all related to the implementation of job control. XENIX System V Release 2.1.0 does not support job control.

4.13 Ulimit

The maximum file size, as specified by `ulimit(S)`, is easily adjusted upward. The `login(M)` utility checks the file `/etc/default/login` for the default `ulimit` size. Refer to the manual pages for `default(M)`, `login(M)`, and `ulimit(S)`.

5. Hardware Notes

This section contains notes relating to hardware issues.

In general, your hardware configuration must have the original settings and boards before you boot XENIX. If you have added any boards, make sure that all switches are set as recommended in the manufacturer's hardware manual for that board. These guidelines must be followed to ensure proper system performance.

XENIX must boot from the physical drive 0 (the internal hard disk).

5.1 Clockrate Adjustment

The clocks of some computers operate at a different frequency than the default setting. You can check the accuracy of your clock rate using `date(C)` command over a period of days. If the system clock gains or loses time excessively, refer to the manual page `clockrate(C)` for information on setting the clock rate.

The default clock rate for generic 8086 and 80286 machines is 1.19318. The correct clock rate for an AT&T 6300 or Olivetti M24 is 1.22878.

5.2 IMAGEN printers — `ips(C)`

When using an IMAGEN printer in parallel printer mode (using `ipbs`, see `ips(C)`) you must specify the quote character as ASCII 2 and the EOF character as ASCII 4. Control characters must be "taken as is". Refer to the IMAGEN system manuals provided with the printer, for information on specifying these characters in the printer configuration.

5.3 Serial I/O Chips

Some computers or add on serial I/O cards use the 8250a serial I/O chip. This chip does not handle interrupts properly. DOS does not use interrupts, so the use of this chip with DOS causes no problems. XENIX does make use of interrupts, as it is a multi-tasking operating system. The problem with the serial I/O chip shows up when using **uucp(C)** or **cu(C)**. Indications that your computer contains an 8250a chip are that **uucp(C)** may lose characters constantly and generate unkillable **uucico** processes and that **cu(C)** at high baud rates hangs and will not exit.

The problem rarely shows up when using the serial port with a terminal. It is associated with high-speed serial input. If you want to use **uucp(C)** or **cu(C)** and your computer has one of these chips, we recommend you replace the 8250a chip with an 8250b serial I/O chip or use a multi-function card containing a serial port and configure it as COM1 or COM2. Configure the built-in serial port as COM3 or COM4, and avoid using the port with high-speed input.

5.4 Serial Lines

There are 4 and 8 port serial port expansion cards available. The ports on these cards are accessible only when the jumpered I/O address is properly set. The addresses vary for different manufacturers of boards, and for the port. The following table lists (hexadecimal) addresses for the Hostess, Arnet, AST and Sperry expansion cards. The Hostess and Arnet cards are available in 4 and 8 port versions. The AST and Sperry cards are available in 4 port version only. The Sperry card works with the Sperry PC/IT only.

Serial Card Addresses					
Physical Port	Board Type	Primary I/O Address	Primary Status Address	Alternate I/O Address	Alternate Status Address
COM1	Hostess	0x500	n/a	0x680	n/a
	Arnet	0x100	0x140	0x280	0x2C0
	AST	0x2A0	n/a	none	n/a
	AMI lamb*	none	n/a	none	n/a
COM2	Hostess	0x580	n/a	0x700	n/a
	Arnet	0x180	0x1C0	0x300	0x340
	AST	0x1A8	n/a	none	n/a
	AMI lamb*	0x2C0	0x210	none	n/a
OTHER1	Sperry**	0x400	n/a	none	n/a
OTHER2	Sperry**	0x408	n/a	none	n/a

* Only continuous mode is supported.

** These serial cards only work on the Sperry PC/IT.

Check your serial card hardware manual or call the hardware manufacturer for the switch settings that implement these addresses.

Refer to Appendix B "Compatible Hardware" of these *Release Notes* and the serial(M) manual page for more information on compatible serial I/O cards and serial lines.

6. Software Notes

This section explains some software issues of note.

6.1 Include Files and Utilities

Machine dependent Development System include files and utilities are included on the 2.1.0 Operating System Nn Volumes. If you do not install the Link Kit and the Development System set, you will not be prompted to extract any files off some of the NFI volumes.

6.2 crypt(C)

The **crypt(C)** command has been removed from XENIX System V. If you want the **crypt(C)** utility and associated **crypt(S)** libraries, and you live in the United States, contact the support center listed on the support information card included with the software.

6.3 csh(C) - sh(C) Conflicts

The C-shell, **csh(C)**, has many built-in commands with the same name and functionality, but different syntax, than those used by the **sh(C)** shell. The **sh(C)** commands are those documented in the *XENIX Reference*. An example of two commands which exhibit this behavior are **echo** and **nice**. Refer to the manual page **csh(C)** for information on built-in C-shell commands.

An */etc/cshrc* file is included with this release. You can customize the C-shell environment for all **csh(C)** users by using this file (similar to */etc/profile* for **sh(C)** users).

6.4 fdisk(C)

The **fdisk(C)** utility does not allocate the last track on the hard disk unless the "Use Entire Disk for XENIX" option is used. The "Create XENIX Partition" option always leaves the last track unassigned.

For example, if a disk has 2442 tracks, **fdisk** reports these as tracks 0-2441. It will assign (using the "Create XENIX Partition" option) tracks 1-2440. Track 0 is reserved. Track 2441 is only assigned with the "Use Entire Disk for XENIX" option.

6.5 format(C)

The **format(C)** utility does not format floppies for use under DOS. Also, XENIX requires error free floppies.

6.6 lp(C)

The standard parallel printer devices (*/dev/lp*, */dev/lp0*, */dev/lp1*, and */dev/lp2*) send a printer initialization string (*init*) the first time the device is opened after the system boots. This is done on the first open only so that printers with large text buffers will not be flushed by the sending of another file.

Some parallel printers require initialization every time a file is received for printing. Others require an *init* if the printer is turned off and back on again (for example, after changing paper or ribbons). The symptom of this situation is that the printer works fine until it is turned off and then back on.

If you need to initialize the printer more often than the standard devices provide, you can create an additional device file for the parallel port in use. This "init device file" can be used when necessary to initialize the printer.

1. Login as super-user
2. Determine which device is the parallel port you are using. This example assumes the device is the main parallel port (*/dev/lp0*).
3. Make a new device file that sends an *init* every time it sends a file:

```
# /etc/mknod /dev/lp0i c 6 128
# sync
```

The commands for the other parallel ports are:

```
# /etc/mknod /dev/lp1i c 6 129
# /etc/mknod /dev/lp2i c 6 130
```

If your printer needs an *init* when it is turned off and on, use the following command line after the printer is turned on. Initialize the printer before the first file is sent to the printer (this example assumes the main parallel port):

```
# >/dev/lp0i
```


If your printer needs an *init* every time a file is sent (and it doesn't have a large internal text buffer) you can use the */dev/lp0i* device all the time:

```
# rm /dev/lp
# ln /dev/lp0i /dev/lp
```

The *lp(C)* command now sends an *init* every time a file is sent to the printer.

Some printers do not have newline/carriage return mapping. If your printer needs to have newlines mapped to newline/carriage returns, specify the *crnlmap* filter when you set up the printer using the *lpinit(C)* command. When you are prompted for the type of printer (dumb printer, Imagen laser printer (parallel interface), Imagen laser printer (serial interface), or other), enter "other". You are then prompted for the pathname of the interface program. The printer filter file is found in */usr/spool/lp/model/crnlmap*.

6.7 mvdir

You must be super-user (root) to use this command.

6.8 pg(C)

This release now includes the *pg(C)* utility.

6.9 runbig(C)

The utility *runbig(C)* is not included with this release. It will be included in future releases.

6.10 uname(C)

No XENIX utilities currently use the node name in the *uname* structure. XENIX utilities use the entry in */etc/systemid*. However, some sites may want to set the node name in the *uname* structure.

There are two ways to set the node name in the **uname** structure but you must have the XENIX Development System to make the change either way. You can use **adb(CP)** to patch the XENIX kernel, or you can use the link kit to recompile and install a new kernel.

Refer to the *Development System Release Notes* for instructions on using **adb** to set the node name.

You can use the link kit to create a new kernel, where the only change is the node name. Install the link kit (use **custom(C)**). Use a text editor to change the:

node=

entry in the file `/usr/sys/conf/c.c`. Follow instructions in Chapter 10 of the *XENIX Operations Guide* "Installing Device Drivers" to create a new `/xenix` and install it.

6.11 Using Raw Devices

When using **dd(C)** or **tar(C)** with a raw device, specify the block size as a multiple of 1K, which is equivalent to 2 "b." This is recommended because **dd (C)** and **tar(C)** use 512 byte blocks. The XENIX filesystem uses 1024 byte blocks. For example, for **dd (C)** using a 9K (system) block size use:

dd if=file of=/dev/rfd0 bs=18b

Specify an even blocking factor with **tar(C)**:

tar cvfb /dev/rfd0 18 file

or use the default tar settings (see **tar(C)**).

6.12 uuCP(C) Notes

This section answers questions you may have about **uuCP(C)** and **cu(C)**. The installation of the **uuCP** programs and utilities is optional. Refer to the chapter "Building a Micnet Network" in the *XENIX Operations Guide* and the chapter on "Building a Communications System" in the *XENIX User's Guide*. Also refer to **custom(C)** to install (or remove) communications files.

XENIX for personal computers

6.12.1 Modem Usage under XENIX

Refer to the XENIX *Operations Guide* chapter "Using Peripheral Devices" for information on modem settings, modem control, aliasing alphabetic characters and dialing with your computer.

6.12.2 Autodialing

The manual page `dial(M)` includes an example C program for using a Hayes modem with `uucp(C)`. This program, unlike the distributed `dial` program, does not make entries in the `LOGFILE`.

In addition to the program on the `dial(M)` manual page, the C language program, `/usr/lib/uucp/dial.c`, for the distributed `/usr/lib/uucp/dial` is included in this release. You can copy and modify `dial.c` or you can use these as examples to write programs to use other kinds of modems. The makefile distributed in `/usr/lib/uucp` should be modified to reflect your own dialer program. You must have the XENIX Development System in order to compile C programs.

If you create a `dial` program for another modem, send us the source. User generated `dial` programs will be considered for inclusion in future releases.

The `uucp` dialup timeout has been increased with this release. This increase is sufficient to allow `uucp` to dial long distance numbers on pulse dial telephone lines.

6.12.3 L-devices and L.sys

We recommend running `uucp(C)` direct connections at 2400 or 4800 baud so that the system's performance is not impaired. These baud rates are specified in the files `/usr/lib/uucp/L-devices` and `/usr/lib/uucp/L.sys`.

Do not use tabs as field separators in the `L.sys` file.

6.12.4 Communications with 3.0 XENIX Systems

If you have trouble connecting to a XENIX System 3.0 with **uucp(C)**, try making that system "active" and the SCO XENIX System V the "slave".

6.13 vi and vedit

The **vedit** utility is supported in this release. It is invoked by typing:

vedit filename

It has essentially the same functionality as **vi**. The difference is in the option settings. **vedit** uses *novice* mode which prevents job control character (Ctrl-Z) mapping, changes the default setting, turns off the **magic** option, sets the option **report=1** and calls the **showmode** option.

The **showmode** option informs the *vedit* user, in a message in the lower right hand corner of the screen, which mode is being used. For instance after the **ESC-i** command is used, the message reads "INSERT MODE".

Note that you can not set the **novice** option from within *vi* or *ex*. If you want to use the **novice** option you must use the *vedit* utility. (It is possible to set the **nonovice** option from within *vedit*.)

6.14 vsh(C)

The use of special characters (*, [,], and ?) is explained in the chapter "Basic Concepts" in the *Introduction to XENIX*. The visual shell, **vsh(C)**, does not currently support the use of these special characters when specifying file names.

The super-user (root) must initialize the visual shell help file before other users can have access to it. To do so, follow these steps:

1. Login as super-user (root).
2. Invoke the visual shell by entering "vsh" on the command line.

3. When the vsh menu comes up, enter "h" (for help).
4. The help file appears, with another menu. Enter "r" (for resume).
5. The main vsh menu appears again. You can now quit from the v-shell. Enter "q" (for quit), then "y" (to confirm the quit).

The vsh help file is now initialized so that all users have access to online help.

7. Documentation Notes

This section lists errors, changes, and general notes about the documentation.

7.1 Blank Pages in the User's Reference

There are several blank pages in the *User's Reference* "(M)" section. They can be removed from the following locations:

boot(M)	1 blank page
console(M)	3 blank pages
fd(M)	1 blank page
keyboard(M)	4 blank pages
machine(M)	1 blank page

7.2 Hardware Related Manual Pages

The following hardware dependent manual pages are located in the (M-HW) section found at the end of the *Run Time Environment* volume:

- boot(M)**
- cmos(M)**
- console(M)**
- 8086(M)**
- fd(M)**
- hd(M)**
- keyboard(M)**
- lp(M)**
- machine(M)**
- parallel(M)**
- serial(M)**

7.3 Replacement Manual Pages

The following manual pages have been revised or added. Please replace the manual pages found in the *User's Reference* with the ones included here. The replacement pages are dated "January 27, 1986".

- mkdev(C)**
- shV(C)** - new, insert between shutdown(C) and sleep(C)

7.4 console(M)

The following escape sequences have functions which are not documented on the manual page `console(M)`. These features are experimental extensions to the ANSI specification and are subject to change or removal from other XENIX releases. They are present and functional in the XENIX System V 2.1.0 release:

- | | |
|--------------------------|--|
| <code>ESC[=CA</code> | where <i>C</i> is 0-15. Sets border color on color adaptors. Color codes are same as for <code>ESC[2;C1;C2m</code> . |
| <code>ESC[=F;TB</code> | Sets bell frequency and duration. <i>F</i> is the value loaded into the timer-counter, and <i>T</i> is the bell duration in 1/10ths of a second (initial settings are 1500 and 2/10ths of a second). |
| <code>ESC[=Ss;SeC</code> | Sets cursor to start at scan line <i>Ss</i> , and end at scan line <i>Se</i> . Default underline cursor is 6,7 for color adaptor and 10,2 for monochrome. |

Another experimental function is the `ioctl` call for setting the screen color from inside a program:

```
attr = ioctl(l, GIO_ATTR, 0)
```

The attribute is returned in `ioctl()`'s return code. The foreground color is in the least significant nibble.

7.5 C-shell

There are four `cs`h(C) **aliases** distributed with the XENIX System V `cs`h. These are *pushd*, *popd*, *swapd*, and *flipd*. These **aliases** maintain a directory stack. They function as follows:

`pushd dir` Pushes the current directory onto the top of the directory stack, changes to the directory *dir*.

- popd** Changes to the directory at the top of the stack, then removes (pops) the top directory from the stack, and announces the current directory.
- swapd** Swaps the top two directories on the stack. The directory on the top becomes the second to the top, and the second to the top directory becomes the top directory.
- flipd** Flips between two directories, the current directory and the top directory on the stack. If you are currently in *dir1*, and *dir2* is on the top of the stack, when *flipd* is invoked, you change to *dir2* and *dir1* is replaced as the top directory on the stack. When *flipd* is again invoked, you change to *dir1* and *dir2* is again the top directory on the stack.

7.6 master(F)

Page 1 of the **master(F)** manual page says:

Field 2: interrupt vector size (decimal, in bytes)

It should read:

Field 2: number of interrupt vectors

Seven lines down it says:

000040 clock ticks

It should read:

000040 clock poll handler

Eight more lines down it says:

000100 init handler

It should read:

000100 no qswitch on interrupt

Page 2 of the **master(F)** manual page says:

Fields 11-14: maximum of four interrupt vector addresses.

It should read:

Fields 11-14: maximum of four interrupt vector numbers.

7.7 su(C)

In order to enable the logging of super-user **su(C)** attempts, the file */etc/default/su* must contain the line:

SULOG=/usr/admin/sulog

8. Restoring Lost Files

The **custom(C)** utility is used to list, install, or remove individual files, sets within the XENIX System packages, or entire packages of the XENIX System. Refer to **custom(C)** in the *XENIX Reference Manual* for information on using **custom**.

9. Packages In This Set

These are the packages in the Operating System:

Operating System Packages	
ALL	Entire operating system set
INST	XENIX installation utilities
PERM	XENIX contents and permissions lists
RTS	XENIX run time system
BASE	Basic extended utility set
BACKUP	System backup and recovery tools
SYSADM	System administration tools
FILE	File manipulation tools
LINK	The link kit
LPR	Multiple line printer spooler
MAIL	Electronic mail and local area networking
CSH	The C-shell
DOS	DOS utilities
VSH	The visual shell
EX	The ex and vi editors
UUCP	uucp and cu communications utilities
*GAMES	Fun and games

Note

* Games are supplied, as is, for your pleasure and enjoyment. They are NOT supported. On line documentation is supplied for some of the games, in the directory */usr/games/doc*.

A. Compatible Hardware

This appendix describes hardware that can be used with XENIX System V.

The hardware listed in this section has been used with XENIX. However, because compatible machine or add-on peripherals manufacturers may change configuration or functionality of firmware at any time, no guarantee of functionality is implied. Please write us with accurate hardware information for possible inclusion on our lists.

Some of the hardware listed requires "vendor supplied drivers." Ask your hardware vendor for the appropriate device driver for SCO XENIX V. Be forewarned that device drivers intended for versions 2.0.3 or earlier may not function with this 2.1.0 release. You must link device drivers, supplied by the hardware vendors, into the XENIX kernel in order to use some of these devices. For information on linking device drivers, see the section "Link Kit" in these *Release Notes* and Chapter 10 of the *XENIX Operations Guide* "Installing Device Drivers."

A.1 XENIX-86 System V

A.1.1 Machines

These machines can run XENIX-86 System V:

AT&T 6300 (Olivetti M24 in Europe)
Compuserve/Canada Arthur in Canada
Compaq Deskpro* and Plus*
Eagle Turbo
Ericsson PC
IBM PC XT
ITT XP
ITT XTRA
Leading Edge
Mitsubishi
NCR PC-6**
Tandy 1200
Sperry
WYSE PC

* Internal cartridge tape not supported.

** For the NCR machine, configure the switches on the motherboard for a color monitor, regardless of the type of monitor used.

Note

ITT DOS cannot share the disk with XENIX or MS-DOS. Therefore, XENIX, or a combination of XENIX and MS-DOS must occupy the whole disk on the ITT machines.

Also note that the ITT XP (286 cpu) runs in 8086 mode.

Some computers arrive with the hard disk only partially formatted. If you have such a machine, use the DOS hard disk format command or Diagnostics diskette to format the entire disk before installing the XENIX Operating System.

Some computers require specific switch settings to run XENIX. If your computer does not run XENIX with the settings as shipped, contact your computer hardware representative for the proper settings.

Some machines may require a clock rate adjustment. Refer to section 5.1 of these *Release Notes*.

A.1.2 Math Chips

You can use these math co-processor chips under XENIX with the following Central Processing Units (CPUs):

8087	For 8088 CPUs.
8087-2	For 8086 CPUs.
8087-3	For fast 8086 CPUs.

A.1.3 Memory Cards

With memory cards, check the switch settings on both the card and mother board. Refer to the hardware manuals for your computer and for the memory card to find the correct switch settings. XENIX-86 supports up to 640K of main memory.

The following memory cards have been used successfully with XENIX-86:

- AST 6 pack+
- Quadram quadboard
- Sigma Maximizer
- Microsoft RAM card
- Tecmar Captain or First-Mate
- AT&T for the 6300

AT&T 6300 note: It is recommended that only AT&T memory cards be used with the 6300. Other cards may considerably slow the machine.

Note

In general, most memory cards work with XENIX-86. If you experience "panic parity" errors it is often because of low quality memory chips or cards.

The serial ports on many multi-function cards will function as expected if COM1 and COM2 are fully compatible with the IBM specifications for these serial ports. See section 5.4 "Serial Lines" and section A.1.5 "Serial I/O Boards" in these *Release Notes*.

A.1.4 Accelerator Boards

Accelerator boards are special cards that plug in to an 8088 machine (not an 8086). They replace the 8088 CPU with a 286 CPU and perhaps replace some memory as well. XENIX System V runs on accelerator boards set in 8086 unmapped mode.

XENIX for personal computers

The following accelerator board is supported in the standard distribution:

Seattle Telecom and Data (STD) PC286

A.1.5 Serial I/O Boards

Note that you should not use cards that use the 8250a serial I/O chip. See the Hardware Notes section in these *Release Notes* on "Serial I/O Chips" for more information on the 8250a chip.

These serial I/O boards are supported in the standard distribution:

IBM standard COM1 and COM2

Control Systems Hostess 4 and 8 port versions

Arnet Controls 4 and 8 port (8250b version)

(clock option not supported)

AST FourPORT/XN

A.1.6 Tape Units

The following tape devices are supported using a device driver supplied by the hardware vendor:

Emerald Systems series 2002	- streaming cartridge
Computone ATvantage-SX Tape backup	- streaming cartridge
Overland Data TC50X	- nine track (reel to reel)

A.1.7 Video Cards and Monitors

The following video cards and monitors have been used successfully with XENIX-86. (They are to be used in character mode only, graphics are not currently supported.)

Video Cards and Monitors	
Card	Monitor
IBM Mono Card	standard monochrome
AST CGA Everex Edge IBM CGA	standard RGB (red green blue) or composite color
IBMEGA	standard monochrome standard RGB color IBMEGA

Cards which come as the default card in supported computers (monochrome or color monitor) work fine with XENIX.

Although many standard emulating cards work with XENIX, these are the ones that we know about.

A.1.8 Networking Cards

This networking card is supported using a device driver supplied by the hardware vendor:

Excelan TCP/IP ethernet card

A.1.9 Add On Hard Disks

Many hard disks can be used by XENIX-86 as long as the disk controller supports the drive. Compatible hard disk controllers are discussed in the next section.

XENIX for personal computers

The following tables list the controllers most commonly used with 8086/8088 machines, and the type of hard disks they can support:

XEBEC Controller (standard IBM PC XT compatible)				
Type	Cyls	Hds	Size	Example
0	306	2	5 MB	
1	375	8	24 MB	
2	306	6	15 MB	
3	306	4	10 MB	standard

DTC Controller (standard on AT+T 6300 - fully supported)				
Type	Cyls	Hds	Size	Example
0	306	2	5 MB	
1	375	8	24 MB	
2	306	6	15 MB	
3	306	4	10 MB	
4	306	2	5 MB	Syquest SQ306 standard
5	644	5	30 MB	CDC Wren
6			20 MB	Seagate ST-225
7			20 MB	Miniscribe 3425
Drive types 8 - 15 reserved				

The following hard disks have been tested successfully with XENIX-86:

Disk	Controller
CMI 15	XEBEC
Miniscribe 20	DTC
Seagate 20	DTC
CDC 30	DTC
Rhodime 30	I ²
Mountain Hard File	built-in controller
Mountain 20, 30	DTC

The following disks are reported to work with XENIX-86, but are untested:

Peachtree 10, 20, 30
Maynard Apollo 30
Franklin Telecom 10, 20, 33
Rhodime 10
Tandon 10
Alpha Omega 10, 20, 30

To determine whether you can use a hard disk with XENIX, the disk must first interface electrically with the disk controller (usually "ST506"). The disk controller ROM must have an entry for the disk (*type*) determined by the number of heads, and the number of cylinders on the disk. The number of cylinders on your disk must be greater than or equal to the number of cylinders listed for that *type*. If these conditions are met, you can use the hard disk, but XENIX can only access up to the number of cylinders in the list.

For example, a "Brand X 40" hard disk has 8 heads and 700 cylinders. It is a type 1 disk on a XEBEC or DTC controller. You can use the Brand X disk, but XENIX can access only 375 cylinders (24 megabytes) of the disk. The only way to access the full disk is to replace the ROM on the disk controller with one that recognizes your disk configuration.

A.1.10 Compatible Hard Disk Controllers

Many hard disks will work with XENIX. Whether or not a disk works depends upon the controller board. Here are two tests the controller must meet:

1. The disk controller board is XEBEC compatible; and,
2. There is no special vendor software needed to make the disk work under DOS.

If a controller meets these tests, it might work, but if it fails these tests, it will not work.

XENIX for personal computers

The following table lists the hard disk controllers known to work with XENIX-86:

Manufacturer	Model#	Comments
XEBEC	1210A	PC XT std. Miniscribe 10mb as well as CMI 15
DTC	5150	6300 std. Miniscribe 10, 20, Seagate 20, CDC 30, Mountain 30
WD	1002/WX-2	a special version of WX-2 is supplied with some CDC 30 disks.
Adaptec	2002	
I ² interface		Rhodime 30
ADES		
CDC		Comes with the CDC 30 add on hard disk.

A.2 XENIX-286 System V

This section discusses some of the hardware known to run with XENIX-286.

A.2.1 Machines

These machines can run XENIX-286 System V:

- Compaq Portable* and DeskPro* 286
- Contel/CADO AT/4
- Corona ATP
- Epson Equity III
- IBM PC AT (20 or 30 meg version)
- Kaypro 286i
- Mitsubishi-286
- NCR PC-8 **
- Sperry PC/IT
- Tandy 3000
- Tomcat 3200-AT
- Victor V286

* Internal cartridge tape not supported.

** For the NCR machine, configure the CMOS database for color monitor, regardless of the type of monitor used.

Although the Texas Instruments Business Pro (color monitor only) will run SCO XENIX, TI XENIX is directly available from TI (and supports more peripherals on TI machines).

Note

For machines with bus or processor speeds greater than 6 mHz, check with your peripheral vendor to verify that their hardware will run under your configuration.

XENIX for personal computers

A.2.2 Math Chips

You can use the following math co-processor chip with XENIX-286:

80287

For 80286 CPUs

A.2.3 Memory Cards

With memory cards, check the switch settings on both the card and mother board. Refer to the hardware manuals for your computer and for the memory card to find the correct switch settings. XENIX-286 supports up to 16 megabytes of main memory, however, hardware modifications might be necessary to add this much memory.

The following memory cards have been used successfully with XENIX-286:

AMI SMART PACK 2

AST

Quadram

Tecmar

Talltree Systems

Silicon Valley Systems

Note

In general, most memory cards work with XENIX-286. If you experience "panic parity" errors it is often because of low quality memory chips or cards.

A.2.4 Serial I/O boards

Note that you should not use cards which have the 8250a serial I/O chip. See the section in these *Release Notes* on "Serial I/O" for more information on the 8250a chip.

The following serial I/O boards are supported in the standard distribution:

Arnet Controls 4 and 8 port (8250b version)
 (clock option not supported)
 AST FourPORT/XN
 Control Systems Hostess 4 and 8 port versions
 IBM standard COM1 and COM2 cards
 Sperry* 4 port card

* This serial I/O board only works with the Sperry PC/IT.

This serial I/O board is supported using a device driver supplied by the hardware vendor:

Computone ATvantage-X smart serial expansion

A.2.5 Tape Units

The following tape devices are supported using a device driver supplied by the hardware vendor.

Computone ATvantage-SX tape backup	-	streaming cartridge
Emerald Systems series 2002	-	streaming cartridge
Overland Data TC50X	-	nine track (reel to reel)

XENIX for personal computers

A.2.6 Video Cards and Monitors

The following video cards and monitors have been used successfully with XENIX-286. (They are to be used in character mode only, graphics are not currently supported.)

Video Cards and Monitors	
Card	Monitor
IBM Mono Card	standard monochrome
A ST CGA Everex Edge IBM CGA	standard RGB (red green blue) or composite color
IBM EGA	standard monochrome standard RGB color IBM EGA

Cards which come as the default card in supported computers (monochrome or color monitors) work fine with XENIX. The TI Business Pro, however, must have a color card and a color monitor.

Although many standard emulating cards work with XENIX, these are the ones that we know about.

A.2.7 Networking Cards

This networking card is supported using a device driver supplied by the hardware vendor:

Excelan TCP/IP ethernet card

A.2.8 Add On Hard Disks

Many hard disks can be used by XENIX-286 as long as the motherboard ROM supports the drive. ROM entries for the IBM PC AT are listed here. Refer to your computer hardware manual for the disk types supported by other computers.

PC AT Disk Types Entries on Motherboard ROM

Type	Cyls.	Hds.	Size	
1	306	4	10 MB	
2	615	4	20 MB	
3	615	6	30 MB	
4	940	8	60 MB	
5	940	6	45 MB	
6	615	4	20 MB	no precompensation
7	462	8	30 MB	
8	733	5	30 MB	
9	900	15	110 MB	
10	820	3	20 MB	
11	855	5	35 MB	
12	855	7	50 MB	
13	306	8	20 MB	
14	733	7	40 MB	
15	0	0	Reserved, do not use.	

Note that other compatible XENIX-286 machines may have different ROM tables. Check your computer hardware reference manual for the appropriate ROM table entries for your computer.

The following hard disks have been tested with XENIX-286:

CDC 20	- with PC AT only
Emerald 50, 70, 140	- with PC AT only
Maxtor 140	- with PC AT as Type 9
CPC 30	- with Sperry PC/IT only

To determine whether you can use a hard disk with XENIX, the disk must first interface electrically with the disk controller (usually "ST506"). The motherboard ROM must have an entry for the disk (*type*) determined by the number of heads, and the number of cylinders on the disk. The number of cylinders on your disk must be greater than or equal to the number of cylinders listed for that *type*. If these conditions are met, you can use the hard disk, but XENIX can only access up to the number of cylinders in the list.

For example, a "Brand X 140" hard disk has 15 heads and 1000 cylinders. It is a type 9 disk on the AT. You can use the Brand X disk, but XENIX can access only 900 cylinders (110 megabytes) of the disk. The only way to access the full disk is to replace the ROM on the motherboard (or other hardware modification) with one that recognizes your disk configuration.

A.3 Modems and Autodialing

Any standard RS-232 modem will work with XENIX-86 and XENIX-286 for personal computers using `uucp(C)` and `cu(C)`. The default autodialer is for the Hayes Smartmodem 1200. An autodial program is also supplied for the Racal Vadic 3451. Other autodialing modems can be supported by writing a dialer program. See the manual page `dial(M)` in the *XENIX Reference Manual* and section 6.12.2 of these *Release Notes* for information on writing other dialer programs.

B. Upgrading to XENIX System V

The following procedure shows you how to upgrade XENIX-86 3.0 and XENIX-286 3.0 to XENIX System V. This procedure does not apply if you are installing XENIX System V for the first time.

Part of the process is to completely reinstall XENIX. With a complete reinstallation you are assured of having all the latest software, your disk is less fragmented when you are finished, and, if you want, you can easily change the size of the XENIX partition or the size of the XENIX swap zone at this time.

This procedure does not affect any other operating systems (or partitions), such as MS-DOS, that currently share the disk with XENIX 3.0, unless you choose to change partition sizes. Refer to Chapter 3 of the *XENIX Installation Guide* "Using DOS and XENIX on the Same Disk" if you want to change the size of your XENIX partition.

Before proceeding, be sure to read all of these *Release Notes*, including new manual pages. Note changes in the software since the last time you installed XENIX.

Follow these steps to upgrade your XENIX system:

1. Shut the system down to Single User (System Maintenance) Mode.
2. Make a full backup of your system.
3. Save particular files from your current system.
4. Install XENIX System V.
5. Relink the kernel, if necessary.
6. Reinstall any applications software packages.
7. Merge the saved files with the reinstalled system.

Note that these are the basic steps and the exact procedure may vary from site to site. Examples are given wherever possible, but you should know how to use commands such as `tar(C)` (or `cpio(C)`).

Remember that an initial pound sign (#) in the examples is the root prompt and is a reminder that you should execute the listed command only when logged in as root. You do not enter the pound sign as part of the command.

If you have local system modifications to the kernel, such as additional device drivers, you must relink these into the new link kit after you reinstall XENIX. Check with the supplier of the other software for further details.

When upgrading from SCO XENIX-86 System 3.0 to SCO XENIX-86 System V, you must save applications data files in ASCII or symbolic

form, not as binaries. This is because the word order was changed from System 3.0 to System V in XENIX-86.

Binaries from SCO, IBM, or Microsoft XENIX-286 System 3.0 are compatible with SCO XENIX-286 System V binaries. However, saving data files in ASCII or symbolic form is still a good idea.

When you restore files after reinstalling XENIX, use the applications to convert your data back to binary form. The procedure for saving data files is discussed in a following section "Data Files and **ar**(CP) Libraries." Restoring data files is discussed in a following section "Merging Saved Files."

B.1 Shut Down the System

You should be the only person logged in to your computer when you perform the upgrade. Make sure any other users know what you are going to do, and when you are going to do it. They may wish to make their own backups before you bring down the system.

Also, advise users to remove unnecessary files. This makes the whole process faster and requires fewer floppies, if they are your only backup media.

Refer to **shutdown(C)** in the *XENIX Reference* for information on bringing the system down to Single User (or System Maintenance) Mode.

B.2 Backup the System

Before you do anything else, make a full backup of the system. Use the **tar(C)** or **cpio(C)** commands. Refer to **tar(C)** and **cpio(C)** in the *XENIX User's Reference*. You cannot use any other filesystem backup utilities.

You should make a backup immediately before you upgrade so that you have the latest possible version of your system. This is especially important in the case of user files, which can change frequently.

Once again, remove any old, unnecessary files. This makes the whole process faster.

B.3 Save Special Files

You can use any backup media, including floppy and tape drives, to save most of your files. Note that if you use a special driver with your backup device, you cannot use that device immediately after installing XENIX System V, since the new kernel is not yet linked with the required device driver. Therefore, for precautionary reasons, we recommend that you backup your files on floppies before you install XENIX System V.

Before you can use any special devices, you must link the new XENIX kernel. If you have source for the device drivers, save the source code on the default backup device, the floppy drive, then recompile the driver on the new system. Also, if you need special, customized libraries, or if any libraries are furnished with your device drivers, save these libraries with the device driver source.

This is important, since you can only read information from the default device, once you reinstall XENIX, until you link the kernel.

B.3.1 Choosing Which Files To Save

You should save any files that are customized or are in some way particular to your system. These files include:

- Applications data files and ar(CP) libraries.
- Any standard system files that are modified for your site.
- Any locally created shell scripts or programs.
- All user directories, subdirectories and files.

At this time, make sure you have the original distributions of any applications packages you use. You must reinstall those software packages after you upgrade the XENIX system.

Save any files you use with your applications, such as databases and control files, in ASCII or symbolic form. For example, if you use Lyrix, you should save all the files in the `/usr/lib/wp` directory. Note that Lyrix data files are already in ASCII form, and you can save them directly onto your backup media.

XENIX for personal computers

You should check the following standard XENIX system files and directories for local changes made to the XENIX 3.0 standard distribution. Save those files which have local modifications.

XENIX 3.0 Files

File or Directory:

Examine for:

/.profile	root <i>sh</i> startup script.
/etc/profile	System wide <i>sh</i> startup script.
/etc/cshrc	System wide <i>csh</i> startup script.
‡/etc/default/*	For local changes.
‡/etc/group	Group database.
‡/etc/passwd	User database.
†/etc/rc	For any local additions.
‡/etc/systemid	The name of your system.
†/etc/ttys	Terminal line configuration data.
/etc/ttytype	Terminal line to terminal type mapping data.
/etc/termcap	For any local entries.
/lib	For locally developed language processors.
/usr/bin/*	For local additions.
/usr/dict/words	For local additions to words .
/usr/include/*	For local additions.
/usr/lib/mail/*	For local mail routing information.
/usr/lib/crontab	cron daemon database.
/usr/lib/font/*	For locally developed font libraries.
/usr/lib/lint/*	For locally developed lint libraries.
/usr/lib/tabset/*	For locally developed tab setting files.
/usr/lib/term/*	For locally developed nroff driving tables.
/usr/lib/tmac/*	For locally developed nroff/troff macros.
/usr/lib/uucp/*	For local uucp configuration files and dialers.
‡/usr/news	For local news.
/usr/spool/*	For current mail , uucp , at , and other files.
‡/usr/[janed,johnd]	User home directories.

It is very important that the files marked with a dagger (†) be examined carefully before reinstalling on XENIX System V. Check the files for local additions or changes, but do not replace the System V versions with your XENIX 3.0 versions. There are changes to content, and sometimes format, of these files with System V. Using the 3.0 versions of these files can cause problems. This is the case for most of this list. Those directories marked with a double dagger (‡) can safely be copied from your 3.0 system. The last item in the above list refers to all individual user directories on the *root* file system. User directories may be in another location or */usr* may be mountable on your system.

B.3.2 Save the Actual Files

When using floppies, make sure they are error free and formatted. XENIX requires high quality media.

The **tar** command is a convenient way to save files. You can also use the **cpio** command. For example, to save the standard system files located in */etc*, enter:

```
# cd /
# tar cv ./etc/profile ./etc/group ./etc/rc ./etc/ttys ./etc/ttytype ./etc/termcap
```

Remember to use the “relative pathname” format with **tar**. For example, specify *./etc/profile*, not */etc/profile*, where the dot (.) indicates the pathname is relative to your current directory.

Make sure you label any floppies or tapes you use with their exact contents, the command used to create the backup, the date and time, and if they are part of a multi-volume set. If you use more than one volume (floppy or tape), use the **k** option with **tar**.

These commands save some user directories as well as other directories in */usr*:

```
# cd /
# tar cv ./usr/johnd ./usr/janed ./usr/spool ./usr/news
```


XENIX for personal computers

These commands save all the Lyrix custom system files in `/usr/lib/wp`:

```
# cd /  
# tar cv ./usr/lib/wp
```

For more information on `tar`, see the *XENIX User's Reference*.

B.3.3 Save Data Files and `ar`(CP) Libraries

If you are using XENIX-86, you must follow these guidelines for saving data files and `ar` libraries. These steps are not necessary under XENIX-286, however they are a good precaution.

Data Files

Applications, such as Multiplan, Informix and Level II COBOL use data files, which you must save in ASCII or symbolic form.

With Multiplan, use the `TRANSFER OPTION` command to save data files in symbolic (SYLK) format. Then transfer the SYLK files to your backup media.

See the "Command Directory" in the *Multiplan User's Guide* for more information on `TRANSFER OPTION`. See also Appendix 4 "The SYLK (Symbolic Link) File Format" in the *Multiplan User's Guide*.

You can save Informix data files using the Informix `UNLOAD` command. Also, with `UNLOAD` you can transfer a file directly to your backup media. For information on `UNLOAD`, see your Informix manual under "`dbstatus`."

All Level II COBOL programs you create are completely portable, so you can save them using `tar` or `cpio` without any special handling. However, C-ISAM® files created under XENIX-86 3.0 cannot be transferred to XENIX-86 System V. You must recreate any such files on the new system.

Extracting and merging your data files is described in section B.7, under "Merging Data Files" and "`ar`(CP) Libraries", in these *Release Notes*.

ar(CP) Libraries

To save **ar** archive files, you:

- Extract the files that make up the archive from the archive file.
- Save the extracted files on your backup media.

For example:

```
# cd /usr/lib  
# ar xv libisam.a
```

When the extract command is finished, you save the resulting files on your backup media:

```
# tar cv `ar t libisam.a`
```

Recreating archives on the new system is discussed section B.7, under "Merging Data Files" and "**ar**(CP) Libraries", in these *Release Notes*.

B.4 Install XENIX System V

After you have backed up the system and saved all special files that you need for your system, install XENIX System V. Follow the instructions in the *XENIX Installation Guide* in the binder marked "XENIX Operating System *Run Time Environment*" to install the XENIX Operating System. furnished with System V.

If you have special device drivers, you need to link them into the XENIX kernel when you are finished installing. In this case, make sure you install the link kit software when you reinstall XENIX.

Also, you must recompile any device drivers under SCO XENIX System V. If you are going to recompile any device drivers, be sure to install the Development System. If you do not have source code for the device drivers you use, you should obtain new binaries which run under SCO XENIX System V from the manufacturer or vendor of the device.

When you are finished installing, make sure you are in Single User, or System Maintenance Mode. Then return to the next section to merge the special files you saved with your new operating system.

B.5 Relink the Kernel

If you have special device drivers, you must:

- Recompile the software under XENIX System V, or obtain a replacement.
- Link the driver into the XENIX kernel with the link kit.

Any device drivers compiled under SCO XENIX 3.0 must be recompiled under System V. You may have to obtain an SCO XENIX System V version of any drivers from the driver or device manufacturer if you do not have source code.

Make sure you installed the link kit software. If you have not done so, see **custom(C)** for information on extracting packages from XENIX System V distributions.

B.6 Reinstall Applications

All SCO XENIX 3.0 applications run on SCO XENIX System V. Therefore, you should use the original distribution floppies to reinstall any applications.

See the appropriate release notes and installation manuals for information on installing any applications programs. Install any such programs as if this is the first time.

Do not copy or save the applications from the old system, unless the original distributions are lost or damaged, and you cannot replace them. It is safer to reinstall applications software packages.

B.7 Merge Saved Files

Once XENIX and any applications are reinstalled, you can merge in new files. This section describes the procedure for merging standard system files, data files, and **ar** libraries.

Note

Remember that all commands given in this section are only examples. The exact procedure depends upon how and in what order you saved your files and directories.

For standard system files, except for */usr/spool* and */usr/[janed,johnd]* files, prepare a temporary directory and extract the files from a backup volume into this directory:

```
# mkdir /usr/convert
# cd /usr/convert
# tar x
```

Move the extracted files to their correct locations, for example if you have extracted files which belong in */etc*:

```
# mv ./etc/* /etc
```

Repeat the **tar** extraction for each volume you made.

The spooling directory and the users' home directories are very simple to extract directly into the correct directories. For example, with the media containing */usr/[johnd, janed]* and */usr/spool* mounted in the default device, enter:

```
# cd /usr
# tar xv
```

Special Lyrix files can be extracted in place from your backup media. For example, with the backup volume containing */usr/lib/wp* mounted in the default device:

```
# cd /usr/lib/wp
# tar xv
```


Other files, however, must be merged into the distributed versions by hand, for example, with the following files already extracted into the *convert* directory:

```
# cd /usr/convert/etc; cp passwd group ttytype /etc
# cd /usr/convert/usr/lib
# cp crontab /usr/spool/cron/crontabs/root
```

Be careful when merging files, especially complex data files like */etc/rc*, */etc/termcap*, or */etc/tty*s. Use the *diff(C)* program to note the differences between newly installed files, and those you save from your previous system. Add the differences, if they are necessary, to the new System V files. Do not directly overwrite the System V versions with your 3.0 version files.

After all the files have been examined and local site information is merged into the System V files, remember to clean up:

```
# cd / ; rm -fr /usr/convert
```

Merge Data Files

For Multiplan data files that are saved in symbolic form, extract them into the appropriate directories from the backup media. Then use the Multiplan command *TRANSFER OPTIONS* to translate the file from symbolic form.

With Informix, extract the data files into the appropriate directories. Use the *LOAD* command, described in the "*dbstatus*" section of the Informix manual.

ar(CP) Libraries

To merge archive and library files, create a scratch directory, or work in */tmp*. Mount the backup volume containing the appropriate libraries. Remember, you saved them individually.

Extract the files, for example:

```
# cd /tmp
# tar xv
```

Rearchive the extracted files, for instance with our *libisam.a* example:

```
# ar ruv libisam.a *.o
```


When the archive is created, run the `ranlib` program:

```
# ranlib libisam.a
```

Finally, move the new archive back to the appropriate directory and remove any unneeded files:

```
# mv libisam.a /usr/lib
```

```
# rm *.o
```

Your upgrade is now complete.